



Demonstration of Variable Radiator (DoVR)

Problem Statement

- Demonstration of a variable heat rejection technology through the change in effective radiator area by modulating liquid between selected radiator lines and a separator/accumulator.
- Technology enables missions with challenging thermal environments and demanding heat loads.
- Flight program will demonstrate repeated fluid exchange between separator and radiator during weightless conditions as well as long duration operation of phase separator under zero gravity.

Technology Development Team

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- **Potential Partners:**
NASA, Advanced Cooling Technologies.

Proposed Flight Experiment

Experiment Readiness:

- January 2014. Need to develop flight packaging hardware based on identified vehicle.

Test Vehicles:

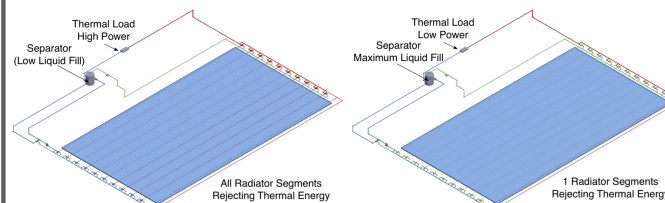
- Parabolic Aircraft or sRLV.

Test Environment:

- Vortex Separator has flown on parabolic aircraft >5000 parabolas. Most recently as part of MFEST experiment – Feb/Mar 2013.
- Desire long duration, high quality microgravity to demonstrate fluid exchange between separator and simulated radiator line under weightless conditions.

Test Apparatus Description:

- Middeck locker or equivalent – Experiment will be automated for flight.



Technology Maturation

- Controlled fluid exchange under weightless conditions must be demonstrated.
- Steps to mature technology are 1. demonstration of variable heat rejection (1g - complete), 2. demonstration of fluid handling under weightless conditions (1g - complete), 3. demonstrate fluid modulation under weightless conditions (0g - 2014).
- Technology maturation deadline is to support advanced variable heat rejection mission needs.

Objective of Proposed Experiment

- Repeated evacuation and filling of simulated radiator line through exchange with separator/accumulator.
- Flight data will include liquid content of radiator lines using video and/or capacitance techniques as well as video imagery of separator performance.
- Data will validate fluid models and increase confidence in zero gravity performance.